

### **REMARKS**

Applicant acknowledges receipt of the Final Office Action mailed October 28, 2009.

In the Final Office Action<sup>1</sup>, the Examiner rejected claims 1, 3, 5-7, 20, 21, 24, and 25 under 35 U.S.C. § 103(a) as being unpatentable over European Patent Document EP 0568045 A1 to Kawata et al. ("*Kawata*"); rejected claims 1, 3-7, 20, 21, 24, and 25 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,935,141 to Buck et al. ("*Buck*") in view of *Kawata*; and rejected claim 4 under U.S.C. § 103(a) as being unpatentable over *Kawata* in view of *Buck* and U.S. Patent No. 5,707,522 to Maeda et al. ("*Maeda*").

No claim is amended herein. Upon entry of this response, claims 1, 3-21, and 24-27 remain pending, with claims 8-19, 26, and 27 withdrawn from consideration. Of the claims under examination, claim 1 is the only independent claim.

Applicant traverses the rejections above and respectfully requests reconsideration for at least the reasons that follow.

### **INTERVIEW SUMMARY**

Applicant thanks the Examiner for the interview conducted with Applicant's representative on January 12, 2010. During the interview, Applicant's representative and the Examiner discussed the Final Rejection and the references cited in the rejection. Applicant's representative reiterated Applicant's argument submitted on page 8-10 of Applicant's Reply to Office Action submitted on June 26, 2009. Specifically,

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<sup>1</sup> The Final Office Action contains a number of statements reflecting characterizations of the related art and the claims. Regardless of whether any such statement is identified herein, Applicant declines to automatically subscribe to any statement or characterization in the Final Office Action.

Applicant submitted that the feature of “a fourth outer layer in the form of a sponge layer having an outer surface having pores with sizes in the range of 0.5-3  $\mu\text{m}$ , the number of said pores on the outer surface of the sponge layer being in the range of 10,000 to 150,000 pores per  $\text{mm}^2$ ,” as recited in independent claim 1, includes unexpected or non-obvious properties, which rebut any prima facie case of obviousness established by the Examiner. The Examiner suggested that Applicant provide further arguments and/or evidence indicating why the prior art process would not result in Applicant’s claimed pore density.

### **35 U.S.C. § 103(a) REJECTIONS**

Applicant respectfully traverses the rejection of claims 1, 3, 5-7, 20, 21, 24, and 25 under 35 U.S.C. § 103(a) as being unpatentable over *Kawata*. In the Final Office Action, the Examiner conceded that “EP '045 differs and does not teach the number of pores present on the outer surface.” (Final Office Action at 3.) However, the Examiner contended that “Kawata teaches the same materials, the same pore sizes of the layers and substantially the same process of Kawata, therefore it is reasonable to presume that the pore density of the outer surface is would [sic] be the same as Applicant’s pore density.” (Interview Summary.) Applicant respectfully disagrees.

Fig. 1 of the *Kawata* reference discloses “an SEM (scanning electron microscopic) photograph of 10,000x magnification showing a structural feature of the outer surface layer of the polysulfone-based hollow fiber membrane obtained in Example 2.” (Page 5, lines 8-10.) Example 2 of *Kawata* uses an “atmosphere conditioned to a relative humidity of 80% and a temperature of 50°C.” (Page 12, lines 9-15.) The number of pores in Fig. 1 can be counted and the pore density on the

surface of the membrane obtained in Example 2 can be calculated using the factor of magnification given in the reference. As a result, a pore density of 2,600,000 per  $\text{mm}^2$  is obtained for the membrane of Example 2 of *Kawata*. Therefore, although the diameters of the pores in the outer surface of the membrane of *Kawata* overlap with the range claimed in the instant application (Example 2 of *Kawata* states 0.05-1 micron while independent claim 1 recites 0.5-3  $\mu\text{m}$ ), the pore density of *Kawata* is more than an order of magnitude higher than the upper limit of the range recited in independent claim 1 (2,600,000 pores per  $\text{mm}^2$  as compared to 10,000 to 150,000 pores per  $\text{mm}^2$ ). Accordingly, the pore density recited in independent claim 1 is not inherent to the structure of *Kawata*.

Without wishing to be bound by theory, Applicant further submits that the solvent contained in the atmosphere in the spinning shaft is responsible for a certain degree of redissolution of the precipitated polymer in the outer surface of the membrane. By the flow of the solubilized polymer material, a certain percentage of the pores initially formed on the surface are closed again. This results in a reduction of the overall number of pores. This is further evidenced by the observation that the pore size distribution on the surface of the membrane of the instant application is narrower than the pore size distribution of the membrane of *Kawata* (0.5-3  $\mu\text{m}$  as compared to 0.05 to 1 micron). The smallest pores make the highest contribution to the overall surface energy and will be preferentially closed, because the flow of the material is driven in the direction of minimal surface energy.

Accordingly, *Kawata* does not disclose or suggest either explicitly or inherently “a fourth outer layer in the form of a sponge layer having an outer surface having pores

with sizes in the range of 0.5-3  $\mu\text{m}$ , the number of said pores on the outer surface of the sponge layer being in the range of 10,000 to 150,000 pores per  $\text{mm}^2$ ,” as recited in independent claim 1. Consequently, the Final Office Action has neither properly determined the scope and content of the prior art nor properly ascertained the differences between the prior art and the claims. Therefore, a *prima facie* case of obviousness has not been established and independent claim 1 is patentable over *Kawata*. Claims 3, 5-7, 20, 21, 24, and 25 are also patentable at least due to their dependence from allowable independent claim 1, and based on their additional recitations of novel subject matter. Applicant therefore requests that this rejection of claims 1, 3, 5-7, 20, 21, 24, and 25 under 35 U.S.C. § 103(a) be withdrawn.

Applicant respectfully traverses the rejection of claims 1, 3-7, 20, 21, 24, and 25 under 35 U.S.C. § 103(a) as being unpatentable over *Buck* in view of *Kawata*. Applicant respectfully disagrees with the Examiner’s arguments and conclusions and submits that independent claim 1 patentably distinguishes over *Buck* and *Kawata* at least for the reasons described below.

*Buck* is completely silent about the properties of the outer surface of the hollow fiber membrane produced and mentions neither pore size nor pore density. The process of *Buck* also differs from the process taught in the instant application in that it does not use an air gap with a controlled atmosphere. There is no indication that would lead the person skilled in the art to expect the membrane produced according to *Buck* to have surface properties similar to those of the membrane of independent claim 1. Accordingly, *Buck* does not disclose or suggest “a fourth outer layer in the form of a sponge layer having an outer surface having pores with sizes in the range of 0.5-3  $\mu\text{m}$ ,

the number of said pores on the outer surface of the sponge layer being in the range of 10,000 to 150,000 pores per mm<sup>2</sup>,” as recited in independent claim 1.

*Kawata* does not remedy the deficiencies of *Buck*. As noted previously, *Kawata* does not disclose or suggest either explicitly or inherently “a fourth outer layer in the form of a sponge layer having an outer surface having pores with sizes in the range of 0.5-3 μm, the number of said pores on the outer surface of the sponge layer being in the range of 10,000 to 150,000 pores per mm<sup>2</sup>,” as recited in independent claim 1.

Accordingly, in the Final Office Action, the Examiner has neither properly determined the scope and content of the prior art nor properly ascertained the differences between the prior art and the claims. No reason has been clearly articulated as to why the claims would have been obvious to one of ordinary skill in view of the prior art. Moreover, one of ordinary skill in the art having knowledge of *Buck* and *Kawata* would not have had a reasonable expectation of success in obtaining the claimed invention based on even a hypothetical proposed combination of these references. Therefore, a *prima facie* case of obviousness has not been established and independent claim 1 is patentable over *Buck* and *Kawata*. Claims 3, 5-7, 20, 21, 24, and 25 are also patentable due at least to their dependence from allowable independent claim 1, and due to their additional recitations of novel subject matter. Applicant therefore requests that this rejection of claims 1, 3, 5-7, 20, 21, 24, and 25 under 35 U.S.C. § 103(a) be withdrawn.

Claim 4 stands rejected under U.S.C. § 103(a) as being unpatentable over *Kawata* in view of *Buck* and *Maeda*. Applicant respectfully traverses this rejection and requests that the Examiner withdraw the rejection and allow the claim.

As noted previously, *Kawata* and *Buck* do not disclose or suggest “a fourth outer layer in the form of a sponge layer having an outer surface having pores with sizes in the range of 0.5-3  $\mu\text{m}$ , the number of said pores on the outer surface of the sponge layer being in the range of 10,000 to 150,000 pores per  $\text{mm}^2$ ,” as recited in independent claim 1. *Maeda* does not remedy the deficiencies of *Kawata* and *Buck*. Specifically, *Maeda* also does not disclose pore densities for the outer surface layer.

Claim 4 depends from independent claim 1 and requires all elements thereof. As explained above, the elements of independent claim 1 are neither taught nor suggested by the cited references. In addition, in the Final Office Action, the Examiner has neither determined the scope and content of the prior art nor ascertained the differences between the prior art and the claims. No reason has been clearly articulated as to why the claims would have been obvious to one of ordinary skill in view of the prior art and a *prima facie* case of obviousness has not been established for claim 4 at least due to its dependence from allowable independent claim 1. Therefore, Applicant requests that the rejection of claim 4 under 35 U.S.C. § 103(a) be withdrawn.

Summarizing, Applicant submits that none of the references cited by the Examiner elaborates on the properties of the outer surface layer of the hollow fiber membrane. In particular, none of the cited references discloses or teaches how to obtain a membrane having in its outer surface the pore sizes and densities recited in independent claim 1. No motivation is provided to the person skilled in the art to modify the teachings provided by *Kawata*, *Buck*, and/or *Maeda* in order to arrive at the membrane recited in independent claim 1. Nor has the Examiner shown that one skilled in the art would have had a reasonable expectation of success in obtaining the invention

recited in independent claim 1 by combining the cited references. Thus, for at least these reasons, independent claim 1 is allowable over the cited references.

### **CONCLUSION**

Applicant requests the Examiner's reconsideration and reexamination of the application, and the timely allowance of pending claims 1, 3-21, and 24-27.

Applicant respectfully points out that the final action by the Examiner presented some new arguments as to the application of the art against Applicant's claims. It is respectfully submitted that the entering of the Request for Reconsideration After Final would allow the Applicant to reply to the final rejections and place the application in condition for allowance.

Applicant further submits that the entry of the Request for Reconsideration After Final would place the application in better form for appeal, should the Examiner dispute the patentability of the pending claims.

In view of the foregoing remarks, Applicant submits that this claimed invention is neither anticipated nor rendered obvious in view of the prior art references cited against this application. Applicant therefore requests the entry of this Request for Reconsideration After Final, the Examiner's reconsideration and reexamination of the application, and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our Deposit Account No. 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,  
GARRETT & DUNNER, L.L.P.

Dated: March 1, 2010

By /Aaron L. Parker/  
Aaron L. Parker  
Reg. No. 50,785